REMARKS

In the Office Action of December 28, 2004, the Examiner: (1) found applicant's arguments filed on 20 October 2004 not persuasive; (2) rejected claims 1, 3-5, 11 and 12 under 35 U.S.C. 102(e) as being anticipated by Gnadinger (6,674,110); (3) rejected claims 2 and 6 under 35 U.S.C. 103(a) as being unpatentable over Gnadinger in view of Willer et al. (6,538,273); (4) rejected claims 7-10 under 35 U.S.C. 103(a) as being unpatentable over Gnadinger in view of Moon (5,744,374): (5) rejected claims 13 and 15-20 under 35 U.S.C. 103(a) as being unpatentable over Gnadinger in view of Sakai et al. (2003/0067022; and (6) rejected claim 14 under 35 U.S.C. 103(a) as being unpatentable over Gnadinger in view of Sakai et al. as applied to claim 13 above, and further in view of Willer et al.

Applicant respectfully submits that the Examiner, in her rejections under §102 and §103, has misread what Gnadinger shows. At the top of page 3 of the Office Action, the Examiner identifies the electrode conductive layer as being described in Gnadinger at col. 5, lines 44-53. The description there is of the conductive gate layer 50, not the interfacial layer 31. Applicant claims a conductive oxide layer between the substrate and the ferroelectric material. For the following reasons, applicant submits that there is no teaching or suggestion in Gnadinger of such a conductive oxide layer as defined in applicant's claims. As such, all rejections based on the existence of such a teaching or suggestion in Gnadinger are hereby respectfully traversed.

1. The office action argued that Gnadinger discloses forming a conductive oxide layer (the interfacial layer 31) overlying and directly

contacting the substrate. Applicant submits that this interfacial layer 31, disclosed by Gnadinger, is a dielectric.

The followings are the disclosed data from Gnadinger:

a. Gnadinger discloses a ferroelectric transistor comprising a substrate 20, an interfacial layer 31 overlying and directly contacting the substrate, a ferroelectric layer 30 disposed on the interfacial layer 31, and an conductive gate material 50 disposed on the ferroelectric layer 30 (Fig. 2A). Thus the material layer overlying and directly contacting the substrate in Gnadinger's ferroelectric transistor is the interfacial layer 31.

b. The interfacial layer 31 is a mixture of the oxides of silicon and the rare earth element (col. 5, lines 30-31) or the rare earth oxides (col. 7, lines 43-44).

c. The interfacial layer 31 is stable and has a relative high dielectric permittivity value (col. 3, lines 62-65; col. 7, lines 41-43).

d. The preferred embodiments of the interfacial layer 31 are Ce_2O_3, Y_2O_3, or Pr_2O_3, which are have relative dielectric permittivities of about 20-30 (col. 7, lines 47-50). Ce_2O_3, Y_2O_3, or Pr_2O_3 are all dielectric material.

e. Gnadinger's novel ferroelectric transistor design is characterized by a high dielectric constant interfacial layer 31 together with a low dielectric constant ferroelectric layer 30 to permit high voltage drop across the ferroelectric layer 30 (col. 3, lines 15-18).

f. The interfacial layer 31 is modeled as a capacitor in series with a capacitor model of the ferroelectric layer 30 (Fig. 3B; col. 8, lines 47-53).

From the above disclosed data of Gnadinger, the interfacial layer 31 is described as having a high dielectric constant, modeled as a

capacitor, and with preferred embodiments of various dielectric materials. This means the interfacial layer 31 of Gnadinger is a dielectric and not a conductive oxide. The interfacial layer 31 is disclosed to be a mixture of the oxides of silicon and "the rare earth element" or "the rare earth oxides." Silicon oxide is a dielectric material, and rare earth oxides typically are dielectric materials (while rare earth elements are metals).

There is no suggestion in Gnadinger that silicon oxide, if used in layer 31, has been rendered conductive. It is ordinarily a dielectric.

Applicant acknowledges that the dielectric property of the rare earth oxides can be modified to make them conductive, for example, by doping the rare earth oxides with suitable conductive dopants. Applicant submits, however, that Gnadinger does not disclose, teach, or suggest the use of conductively-doped rare earth oxides. Gnadinger includes absolutely no suggestion that the interfacial layer 31 is electrically conductive. The specifically cited materials comprising layer 31 in Gnadinger are dielectric, including rare earth oxides and silicon oxide. This, together with the reciting of the dielectric permittivity value of the interfacial layer 31 (col. 7, lines 41-43), the capacitance modeling of the interfacial layer, and the citing of various dielectric materials as the preferred embodiments for the interfacial layer, clearly show that Gnadinger discloses a dielectric material for the interfacial layer 31, not a conductive oxide.

2. With respect to the prior art of Willer et al., Moon, and Sakai et al., applicant submits that Willer et al. discloses forming a metallic layer (not a conductive oxide layer) overlying and directly contacting the substrate (Second sentence, Abstract). With respect to Moon, applicant submits that Moon discloses forming a dielectric material of yttrium oxide (not a

conductive oxide layer) overlying and directly contacting the substrate (Abstract, line 6). And with respect to Sakai et al., applicant submits that Sakai et al. discloses forming a first insulator layer (not a conductive oxide layer) overlying and directly contacting the substrate (Abstract, line 7).

In sum, applicant submits that the prior art of Gnadinger, Willer et al., Moon, and Sakai et al, singly or in combination, do not disclose a conductive oxide layer overlying and directly contacting the substrate, nor do they disclose applicant's other claimed structure and method elements, and they thus cannot anticipate the present invention nor render applicant's claims obvious.

This response is accompanied by a Petition for Extension of Time Under 37 C.F.R. §1.136(a) requesting a one-month extension, together with a deposit account authorization for the fee therefore.

In view of the foregoing, applicant requests reconsideration of the application and requests that it be passed to issue.

Respectfully submitted,

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